Homework

November 18, 2019

1 Lecture 5

1. Generalize the switching subgradient scheme for general geometry and Mirror Descent steps instead of the projected subgradient steps.

2. In the setting for Mirror Descent, assume that for the chosen geometry given by the norm $\| \cdot \|$ and distance generating function $v(\cdot)$ the objective function is Lipschitz $\|\nabla f(x)\|_* \leq M$ and "relatively strongly convex" w.r.t. v:

$$f(y) \geq f(x) + \langle \nabla f(x), y - x \rangle + \mu V(x, y), \quad \forall x, y \in X.$$

Generalize the analysis of the projected subgradient descent for strongly convex objectives to obtain faster rate of convergence for the Mirror Descent for strongly convex objective.